IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/730,430 Examiner: Lucy M. Thomas

Filing Date: December 8, 2003 Group Art Unit: 2836

Inventor: David G. Fullington Confirmation No.: 2325

Title: *Apparatus and Method For Disabling the Operation of High Powered Device*

Attorney Docket No. 1506.003

REPLY BRIEF UNDER 35 USC §41.41

Mail Stop – Appeal Brief - Patent
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply Brief is being submitted in response to the Examiner's Answer mailed April 16, 2009. Please charge any additional fees to Deposit Account No. 50-1170 (three additional copies of page 1 are attached).

TABLE OF CONTENTS

REPLY

The Answer by the Examiner addresses the interpretation of several key terms in the claims. It is believed that these interpretations are incorrect and do not conform to the required legal standards.

I. Safety Relay

The Examiner states that "patentability does not depend on the name of the relay" which expresses an incorrect understanding of the rules for claim language interpretation during examination. While the Examiner must strive to obtain the broadest possible interpretation of "safety relay", the words in the claims, including phrases such as "safety relay" are to be given their "plain meaning". "Plain meaning" in turn, is the meaning of the word would have to a person of ordinary skill in the art at the time of the invention. See generally MPEP 2111.01 I citing Phillips v. AWH Corp., 415 F.3d 1303, 1313, 75 USPQ2d 1321, 1326 (Fed. Cir. 2005) (en banc). Further, the plain meaning must be a reasonable interpretation of the words and consistent with the specification. See MPEP 2111.01 I citing In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989).

In this case, the Examiner appears to have disregarded the meaning of the phrase "safety relay" in the industrial control art and has adopted an unreasonably broad interpretation of "relay" to include any electrical switch (for example a switch controlled by a microprocessor) that is inconsistent with the specification's precise definition of the safety relay as an electromechanical device with a coil and with contacts that can be subject to welding.

As recognized in this art, a "safety relay" is a relay that has force-guided or positively-guided contacts, meaning that there is a normally-open and normally-closed contact that are physically linked so that they may not both be closed at the same time particularly in the case of

contact weld. This common understanding is reflected in the description of the "safety relay" in the present published application, for example, at paragraph [0025] as follows:

The safety relay circuit 110 is configured such that the normally-open contact 116 and normally-closed contact 118 are physically coupled so that only one or the other of the contacts can be closed at any given time. Consequently, if the voltage applied across the coil 114 is turned off and the normally-open contact 116 remains closed, then the normally-closed contact 118 remains open and thus the safety on monitor can determine that a fault has occurred due to the open-circuiting of the third and fourth ports 124, 126 and the information that the voltage has been disconnected from the coil 114. Conversely, if the normally-closed contact 118 becomes welded, then the normally-open contact 116 cannot close despite the providing of voltage across the coil 114, and consequently the driver 100 cannot provide nonzero signals on the control line outputs 71-76.

Additional detail on the meaning of "safety relay in the prior art is provided, for example, in the following excerpt from the contemporaneously published textbook: Practical Machinery Safety by David Mcdonald:

5.3 Safety relay terminology

Safety relay is a term applied to a relay device constructed with 'positively guided contacts' that provides a high degree of confidence in its ability to operate correctly or to fail in a safe manner. The term has become extended to cover modular relay assemblies that provide monitoring and buffering functions between safety sensors and the final element control devices such as the contactors.

5.3.1 What is meant by positively guided contacts?

These are relay contacts that are designed with solid mechanical linkages to provide a fixed relation between normally open contacts and normally closed contacts. This provides confidence that each contact in a set will be in the same position and if one set of contacts is closed the opposite set will be open. An alternative description commonly used is 'force-guided contacts'.

In Figure 5.1, the positively guided contacts are forced to be in one state or the other. Hence it is reasonable to use one pair of contacts as a status indicator for the rest of the contacts. It is also highly improbable that the contacts will fail individually.

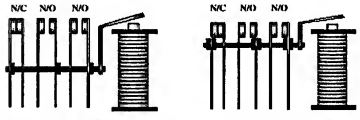


Figure 5.1
Principle of positively guided contacts

See generally, Practical Machinery Safety, David Mcdonald, p. 114 (Newnes 2004).

As is shown in the above figure, a safety relay has contacts arranged so that any "welds" can be detected and in this respect differs from a conventional relay where flexibility of the leaf springs of the contacts and the mounting point of the actuators allows armature movement even when contacts are welded together in a failure situation.

For the reasons described above, it is believed that it is improper to ignore or separate the word "safety" from "safety relay" and that "safety relay" must be interpreted as described in the specification and understood in the art as an electromechanical relay having force-guided contacts permitting detection of contact weld faults.

It is further believe that the Examiner has failed to meet the burden of establishing the meaning of these words to those of ordinary skill in the art or to establish a factual record that properly reveals the Examiner's steps in making this assessment.

Given what is believed to be the proper interpretation of "safety relay" or even the term "relay", it is believed that the Examiner's reading of "safety relay" on two switches S1 and S2 in Schwesig, (possibly solid-state switches not even susceptible to contact welding) driven by a microprocessor, is overly broad and contrary with current case law and Patent Office practice.

II. Electrical isolation

Electrical isolation is also a term having a particular meaning to those of ordinary skill in the art. In this case, "electrical isolation" refers to a degree of electrical separation that would prevent direct electrical flow between components in a failure condition. For example, optical isolators, which break an electrical path, provide "electrical isolation". Electrical isolation is also provided by transformers which provide only a magnetic and not electrical coupling between components and relays which provide for electrical isolation by converting a signal in a coil to a magnetic field which then attracts an armature to close contacts without direct electrical connection to those contacts.

This concept of "electrical isolation" is found in claim 1 which includes the elements of:

a logic circuit generating signals to control the semiconductor switching devices;

and

a safety relay having a contact connected to a power terminal of the low power circuit to control the application of power to the low power circuit, wherein the safety relay is electrically isolated from the logic circuit.

The Applicant generally accepts the Examiner's position that elements ST in the Schwesig reference (see Fig. 1), which provide signals to control semiconductor switching devices, need not be implemented by a microprocessor I1. But in any case, this element ST is still not be electrically isolated from the microprocessor I1 which controls it and thus could not be said to be electrically isolated from the switch S1 that is connected to the microprocessor I1 as suggested by the Examiner. This follows from the fact that two electrically connected devices will not be electrically isolated without additional steps or structure.

This may be the reason that the Examiner has not stated that switch S1 is "electrically isolated" from ST but instead states only that "the control signals to the switches from I1, I2 are not electrically dependent on logic unit ST as ST is separate from I1, I2". The present claims do not use the language "electrical dependency" which presumably means there is a causal rather than electrical connection. Accordingly, in this case, the Examiner has failed to make a prima facie case of the existence of electrical isolation in the key components of the cited reference.

More fundamentally, the cited reference of Schwesig teaches away from the present invention by describing a signal path for an emergency stop of the motor that provides no electrical isolation to the motor drive itself. For example, referring to Fig. 1 of Schwesig, a high voltage electrical fault from the source of the high voltage motor stop SH1, could well ripple through the microprocessor I1 to damage ST because these elements are clearly not electrically isolated from each other but all electrically interconnected (and in fact, as illustrated, the same integrated circuit).

The Examiner states that structure is not claimed to support the electrical isolation provided by the safety relay, however, this structure is the safety relay which couples only magnetically and not electrically thereby providing electrical isolation. It is believed that this

isolation would be well understood to those of ordinary skill in this art and is properly recited in the claims to qualify the manner of connection of the safety relay to the motor drive.

III. Port

A port is also a term of art having meaning to those of ordinary skill in this are and refers to a point of electrical connection (and disconnection) generally accessible for the later installation of components. This term also has a plain meaning as evidenced by its dictionary definition, e.g.: "a connection point for a peripheral device". See, The American Heritage Dictionary of the English Language, Third Edition Copyright © 1992 by Houghton Mifflin Company.

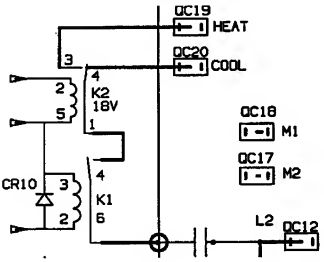
The Examiner takes the position that a port is any location in an electrical circuit including those points in accessible by a user of the device. This interpretation defies the plain meaning of this word and is inconsistent with its been to those of ordinary skill in this art. It is also inconsistent with its use in the present specification which describes the port as a location where a safety relay or other devices may be attached to a motor drive.

IV. Claim 6

Should the Board accept the Examiner's interpretation of "safety relay" as being any electrical switch, claim 6 remains to be addressed. Claim 6 expressly claims the force-guided feature of a standard safety relay as follows:

wherein the safety relay includes a coil, a normally-open contact, and a normally-closed contact, wherein the contacts are physically coupled so that only one of the contacts can be closed at any given time, and wherein the safety relay disables the low power circuit when power is provided to the coil.

None of the references cited by the Examiner describe a "safety relay" and thus it is not surprising that none of the references teach these limitations. In addressing claim 6, the Examiner relies on Fig. 2c of Rowlette (portion shown below) which shows two relays with apparently no physical connection between the relays or the contacts of the relays and no teaching or suggestion that they are "physically coupled so that only one of the contacts can be closed at a given time".



Putting aside whether a person of ordinary skill in the art would transfer a circuit from a furnace to a motor drive, the Examiner has failed to make a prima facie showing that the claim limitations of claim 6 are found in any reference.

CONCLUSION

The combination of references relied upon does not fairly teach the limitations of claims 1, 3-4, 6-8, 10-15, and 24. Therefore, the Applicant requests that the Board overturn the Examiner's rejection of these claims and pass such claims to allowance.

Respectfully Submitted,

Keith M. Baxter, Reg. No. 31,233
Attorney for Applicant
Boyle Fredrickson, SC
840 North Plankinton Avenue
Milwaukee, WI 53203
Attorney Docket No.: 1506.003